



Course Title: Database Systems
Date: 30.11.2015 (Midterm Exam of First term)

Course Code: CCE3112 3rd year
Allowed time: 90 minutes

Answer the following questions:

Question No. 1

(10 marks)

1. Consider the database schema given below that describes movie data, including the movie's title and the production year. Also actors and directors are described, by introducing the relationship between persons and movies. The actor relationship type also includes the role played by the person in the respective movie. As neither persons nor movies can be uniquely identified by a set of their "natural" attributes. Persons are further described by their name, gender and birthday.

With respect to the given schema the following relation schema was derived:

Movie(id, title, year)
Person(id, name, gender, birthday)
Genre(name, description)
actor(person → Person, movie → Movie, role)
director(person → Person, movie → Movie)
hasGenre(movie → Movie, genre → Genre)

Note that: *the → indicates that there is a referential integrity constraint.*

Based on this relation schema, Write a relational algebra and calculus expression for the following queries:

- Find the titles of all movies that have been created before 1970.
- Find the names of all persons who participated in an "action" movie.
- Find the names of all persons who only played in the movie "The mighty Oracle" and did not play in any other movie.

2. Write an SQL statement for the queries in the previous problem.

Question No. 2

(10 marks)

- 1. Answer each of the following questions briefly. The questions are based on the following relational schema:**

Employee(id: integer, name: string, age: integer, salary: real)

Works(employee_id: integer, dept: integer, pcttime: integer)

Dept(dept_id: integer, dept_name: string, budget: real, manager_id: integer)

- a) Give an example of a foreign key constraint that involves the Dept relation. What are the options for enforcing this constraint when a user attempts to delete a Dept tuple?
- b) Write the SQL statements required to create the preceding relations, including appropriate versions of all primary and foreign key integrity constraints.
- c) Define the Dept relation in SQL so that every department must have a manager.
- d) Write an SQL statement to add John Doe as an employee with id = 101, age = 32 and salary = 15, 000.
- e) Write an SQL statement to give every employee a 10 percent raise.
- f) Write an SQL statement to delete the Toy department. Given the referential integrity constraints you chose for this schema, explain what happens when this statement is executed.

- 2. Explain the difference between logical and physical data independence.**

Best wishes
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